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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/577,457	05/24/2000	Mark Vincent Pierson	EN9-99-102	5505

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EXAMINER

MITCHELL, JAMES M

ART UNIT PAPER NUMBER

2827

DATE MAILED: 11/28/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/577,457

Applicant(s)

PIERSON ET AL.

Examiner

James M. Mitchell

Art Unit

2827

-- Th MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 July 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-6 and 10-13 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-6 and 10-13 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other:

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 3, 5, 6, 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnio et al. (US 5,071,359) in combination with Stone (US 5,770,476).

Arnio (Fig 2, 4f; Col.1, Lines 7-8) discloses an interposer for compliantly connecting a chip die (understood to be a chip; not labeled with an inherent pads) to a circuit board comprising a layer of elastic dielectric material (34) with an inherent elastic modulus having an array of copper, metal plated vias (Col. 3, Lin 35) extending from one surface of said dielectric to the other surface and with each of said metal vias similarly sloped with respect to said one and said other surface so as to allow said interposer to flex both vertically and horizontally; with each via terminating in a metal pad (shown as item 16 in Fig 2) that inherently electrically connected to respective pads on said chip die and circuit board; with said elastic member having a uniform array of holes (12; Fig 2a) extending therethrough (Fig 2; 2nd and 4th column) and arranged so that individual ones of said array of copper plated vias (Fig 2; 1st, 3rd and 5th column) so

as to facilitate uniform compliance of said interposer; with said holes with a slope substantially the same as array of copper plated vias .

With respect to the claimed circuit card, Arnio discloses the same invention except that connection is made to a circuit board, Stone (Col. 1, Lines 24-25) shows that a circuit card is an equivalent structure known in the art known in the art. Therefore, because these two contact structures are art recognized equivalents at the time the invention was made, one of ordinary skill in the art would have found it obvious to substitute a circuit card for a circuit board.

Furthermore the recitation in the claim, "so as to allow" is a sufficient to perform function, which is not a positive limitation but only requires the ability to do so.

Claims 4, 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Arnio as applied to claim 3 or 5 and in further combination with Jimarez et al. (US 6,191,952).

Arnio further discloses the thickness of the dielectric to be 10 to 15 mils (Col. 4, Lines 23-24), but does not appear to explicitly disclose that the elastomer has a low modulus in the range of 50,000 to 4000,000 psi.

Jimarez utilizes silicone with a low modulus of 50,000.

It would have been obvious to one of ordinary skill in the art to incorporate a silicone, low modulus elastomer of 50,000 in order to provide a silicone elastomer as required by Arnio and to reduce stress as taught by Jimarez (Abstract).

Claims 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over by Arnio and Stone as applied to claim 5, and further in combination with Sado (U.S 4,330,165).

Neither Arnio nor Stone appear to disclose that the through hole forms a V shaped metal plated via, however Sao utilizes a V shaped metal plated via.

It would have been obvious to one of ordinary skill in the art to form the interposer and through hole of Arnio V shaped in order to facilitate absorption of local stress as taught by Sao (Abstract).

Furthermore, absent evidence of criticality, it would have been an obvious matter of design choice bounded by well known manufacturing constraints and ascertainable by routine experimentation and optimization to choose the particular a sloped via or "V" shaped via because applicant has not disclosed that the dimensions are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical, and it appears prima facie that the process would possess utility using another dimension. Indeed, it has been held that mere dimensional limitations are prima facie obvious absent a disclosure that the limitations are for a particular unobvious purpose, produce an unexpected result, or are otherwise critical. See, for example, *In re Rose*, 220 F.2d 459, 105 USPQ 237 (CCPA 1955); *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); *Gardner v. TEC Systems, Inc.*, 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied, 469 U.S. 830, 225 USPQ 232 (1984); *In re Dailey*, 357 F.2d 669, 149 USPQ 47 (CCPA 1966).

Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Arnio and Stone as applied to claim 6, and further in combination with Isaacs et al. (U.S. 5,275,330).

Neither Arnio nor Stone appear to explicitly disclose that plated through holes (PTH) or vias are filled with solder, however Isaacs (Fig 9) utilizes a PTH filled with solder.

It would have been obvious to one of ordinary skill in the art to fill the PTH or via of the prior art with solder in order to prevent unreliable electrical connections as taught by Isaacs (Abstract) and to provide a metal fill as required by Arnio (Col 7, Lines 20-21).

Response to Arguments

Applicant's arguments with respect to claims 1, 3-6 and 10-13 have been considered.

Applicant contends that Arnio does not teach copper plated vias terminating in copper pads. Examiner respectfully disagrees. Arnio clearly shows the internal hole/vias plated with a copper that terminates in a rim on the surface of the substrate forming a pad portion.

In regards to applicant's assertion that Jimarez does not teach a dielectric modulus in the range of 50-400k. Examiner disagrees. Admittedly applicant indicates that Jimarez teaches utilizing a 50,000 psi modulus. As such, Jimarez falls within the scope of the claim.

Applicant contend that Sado utilizes a V shaped via with a purpose different than applicant and that there would be no reason to combine Arnio and Sado. In response to applicant's argument that there is no suggestion to combine the references, the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is

some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988) and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this case, the motivation to combine was set out in *Sado* as indicated in this and the last office action. The fact that *Sado*'s motivation is different than applicant's has no bearing on the prior art's obvious type rejection.

As to applicant's comments that dimensions go to size not shape and that the applicant is claiming a shape are found unpersuasive, since applicant has relied on mere conjecture without extrinsic evidence. However, even assuming applicant was correct in that the term dimension only applied to size, the cases cited in this and the last office action still make shapes obvious absent criticality.

Lastly, applicant contends that Isaacs use of solder with plated through hole has little to do with solder filled vias in a flexible interposer. The point is moot because Isaac was not relied on for that purpose. Isaac was relied on to show the benefits of a specific type of contact filled with Solder, and since the prior art required a contact, the motivation is deemed proper.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James M. Mitchell whose telephone number is (703) 305-0244. The examiner can normally be reached on M-F 10:30-8:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Kamand Cuneo can be reached on (703) 308-1233. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

Jmm



DAVID E. GRAYBILL
PRIMAR EXAMINER